COMMENTS MATRIX FOR NASCTN TEST PLAN, "**LTE Impacts on AMT**"								
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#	ORGANIZATION & POC Name, Phone, and E-mail	Line Number	Page	Para	Comment Type	Comments and Justification	Resolution	A/R/P

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1	Robert Sole NTIA/OSM/SEAD rsole@ntia.doc.gov	168	viii	1	Editorial	Suggest adding the following text after LTE. "signal power into the AMT receiver.	Text Change	A
2	DISA/DSO/Strategic Planning Division Alden Smith 301-225-3814 Odell.a.smith2.ctr@mail.mil	234	2	1.1	S	The sentence currently reads, "Emissions from LTE devices have the potential to impact operation of adjacent-band AMT systems that operate in the 1780–1850 MHz (L Band) and, to a lesser degree, the 2200–2395 MHz (S Band) frequency bands." Comment: While LTE UE devices (handsets) operating in the 1755-1780 MHz spectrum band may have "a lesser degree" of impact on the 2200-2395 MHz band; the LTE base stations operating at significantly higher power and with directional antennae in the 2155-2180 MHz band could have significant impact on the higher band though it is not directly adjacent. Recommend the sentence be re-worded as follows, "Emissions from LTE handset devices have the potential to impact operation of adjacent-band AMT systems that operate in the 1780–1850 MHz (L Band) and similarly, LTE base stations operating in the 2155-2180 MHz band have the potential to impact AMT systems operating in the 2200–2395 MHz (S Band) frequency band."	Removed reference to 2200-2395 MHz. [We are only tasked with evaluating impacts cause by uplink traffic]	P
3	DISA/DSO/Strategic Planning Division Alden Smith 301-225-3814 Odell.a.smith2.ctr@mail.mil	250	3	1.1	A	Sentence currently begins as, "These measurements could inform influence decisions on . . .". Comment: Wording is awkward. Recommend wording be changed as follows, "These measurements could inform and influence decisions on . . ."	Text Change	A

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4	Edison Juleau ejuleau@ntia.doc.gov	274	4	3	editorial	Suggest changing "response variables" to "control variables" to be consistent with language used later in the document.	"Response variables" and "controlled variables" are two different types of variables. Response variables refers to system outputs that are measured throughout the test, such as KPIs. Controlled variables refers to the variables that are systematically varied through the test to understand the effects they have on the response variables. This terminology is consistent with design of experiments methodologies. Sentences (318, 319, 1nd 320) in which the terminology was used inconsistently have been corrected.	R
5	JHU/APL Feng Ouyang 443-778-2490, feng.ouyang@jhuapl.edu	284	4	1.4	S	Suggest to specify the type of metric reported. For example AMT BER vs UE emission power at the AMT antenna, or AMT BER vs the number of UEs within a distance, or AMT BER vs network traffic within a distance. Justification: although such information is alluded to later in the document, clarifying the objective helps guiding the readers through the rest of the test plan.	added "such as…"	P
6	Edison Juleau NTIA/OSM/SEAD ejuleau@ntia.doc.gov	290	5	1	question	The last bullet on that page point to the analysis that will be done to "capture the impact of LTE on AMT systems". The question is will the analysis include any mitigation to reduce the impact of LTE on AMT systems if it is determined the impact is substantial.	NASCTN's responsibility is to develop test methods, as well as provide a measurement data set and statistical analysis. From these data, an engineer will be able to derive mitigation strategies. We have included the testing of filter options into the experimental design.	P
7	Robert Sole NTIA/OSM/SEAD rsole@ntia.doc.gov	293	6	1	technical	Will the tests be performed in a shielded enclosure to insure no other signals are present that might affect the outcomes? Right now it just says laboratory setting.	We will test for leakage across equipment. The mitigation strategy would be using screen boxes for the equipment.	P
8	Michael Souryal souryal@nist.gov 301-975-4342	318	6	2.2		It seems that the KPIs are dependent or response variables, not "controlled variables" Justification: Replace ?controlled variables? on lines 318-319 with ?response	Text Change [A KPI is a response variable, a control variable is something changed during the test. Adding more clarifying language to	A

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						variables,? the terminology used in Section 3.3. Similarly, correct line 320.	describe differences between KPI/response/control]	
9	JHU/APL Feng Ouyang 443-778-2490, feng.ouyang@jhuapl.edu	322	6	2.2	S	It seems that FIREBERD is not listed as test equipment in Section 2.4 and not shown in Figures 5 and 6.	Added BER tester to Section 2.4, and it is listed line 322 Figures 5,6 and sec 2.4 subject to change? [FIREBERD is a name brand piece of equipment. Section 2.2 lists "FIREBERD type equipment".	A
10	DISA/DSO/Strategic Planning Division Alden Smith 301-225-3814 Odell.a.smith2.ctr@mail.mil	333	7	2.2	A	Sentence currently reads, "Testing at difference . ." Comment: Wording is awkward. Recommend wording be changed to "Testing at different . . ."	Text Change	A
11	Edison Juleau NTIA/OSM/SEAD ejuleau@ntia.doc.gov	362	8	2	question	Figure 4 showing the OOB of UEs in the adjacent AMT band stops at 1820 MHz (on the right). I was wondering if the last OOB level continues flat beyond 1820 MHz. Or does the OOB at 1820 MHz correspond to the noise floor and no measurements were done or necessary past that point.	At ~1810 MHz the noise floor of the test equipment was reached. We need to perform additional measurements (discovery phase) to investigate what artifacts are below Fig 4's noise floor.	P

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12	Jeffrey H. Reed reedjh@vt.edu (540) 231-2972	369	8	2.3.1		UEs operating on the LTE uplink change their emissions behavior ? i.e., modulation, coding, and power emissions ? in response to changes in their environment ? e.g., as UEs move closer to / away from an eNodeB, as the volume of mobile wireless subscribers? data requests ebbs and flows throughout the day, or as an eNodeB evaluates fluctuating channel conditions on the uplink. If static ?surrogate LTE waveforms? ? generated from the UTG or MITRE?s multi-UE testbed ? are to be used, it is unclear if the dynamic behavior of an LTE system in response to changing environmental conditions will be captured. Furthermore, it?s unclear how the ?surrogate LTE waveforms? will be generated to represent different UE transmission locations, volumes of user data requests, and their impact on aggregate power emissions at the AMT system under test. More details would be nice to see. Justification: Additional detail about the UTG, multi-UE testbed and LTE network scenarios of interest should be included in the test plan. UTG/multi-UE testbed details should include how the LTE signal generator is able to effectively provide sufficient experimental controls for the dynamic nature of an LTE system ? e.g., fluctuation of active UEs, fluctuation in UE transmit power power, fluctuation of LTE physical resource block utilization, different possible locations of UEs in the environment when transmitting. Furthermore, it is possible to include configurable UE and eNodeB LTE devices under test to generate LTE signals. LTE eNodeBs and UEs that support a wired RF test bed are available as commercial grade test equipment or can be inexpensively assembled from COTS hardware and open source software. LTE devices under test that generate LTE signals in-real time ? accounting for LTE?s adaptation and power control mechanisms ? in the test setup would address the issues of assessing dynamic LTE behavior in response to AMT adjacent channel operations when evaluating AMT KPIs. Wireless @ Virginia Tech would be able to recommend LTE test equipment to meet the requirements of this test plan, upon request.	Agree, discovery phase needs to answer this first question. Hoping to use SST&D work for this as well. If UE is told to change order modulation, and increase power, it has a ceiling (+23 dBm), so we need to test those edge cases. However, F1 - F2 problem could exist (differing SNRs) NIST TN1980 did show OoBE change with different RB usage need to cycle other LTE parameters.	P

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13	Jeffrey H. Reed reedjh@vt.edu (540) 231-2972	377	8	2.3.1		A study of *adjacent* channel operation between LTE and AMT systems in Brazil (Abularach et al., 2015) suggests that such operation should be possible given sufficient separation between LTE and AMT systems. Furthermore, a study by the Aerospace & Flight Test Radio Coordinating Council (AFTRCC, 2013) of *co-channel* interference between AMT and LTE systems indicates that, ?the interference from AMT aircraft to eNodeBs [receiving on the LTE uplink] will be severe?. In both cases, it?s unclear how much the available study information about AMT and LTE operations from Abularach et al. and AFTRCC are applicable to the operating scenario described in Figure 2 of the test plan (line 240). In general, there is little information publicly available on the impacts of AMT operations on LTE UE behavior. Caution should be taken to understand how adjacent channel AMT operations described in figure 2 (line 240) could cause LTE UEs to change their behavior, thereby potentially changing the KPIs AMT systems are able to achieve. LTE behavior will change with interference, especially if the interference is viewed by LTE systems as noise; LTE power control will kick in. There are no experimental protocols in the current test plan to prove or disprove the hypothesis that adjacent channel AMT operations would alter LTE behavior and subsequently alter the waveforms or power emissions from UEs in the LTE uplink that an AMT system could experience. An implicit test design assumption when testing with pre-recorded static ?surrogate LTE waveforms? is that the emissions from the AMT transmitter under test would not cause the LTE system to change its behavior in a real-world scenario. Abularach, A. J. J., Rodriguez, R. C., Almeida, M. P. C. d., Mello, L. d. S., Neto, G., & Giacomini, F. (2015, June). Coexistence of aeronautical mobile telemetry and IMT systems in the 1300?1518 MHz band. Paper presented at the 2015 International Workshop on Telecommunications (IWT). Available at: https://ieeexplore.ieee.org/document/7224570/ AFTRCC. (2013, Aug). White Paper: Sharing between LTE systems and aeronautical mobile telemetry (AMT) systems in the band 1435-1525 MHz. Retrieved from	We do not know if AMT emissions will affect LTE network behavior. In general, the problem we are investigating is the UE and uplink traffic. AMT emissions are non-adapting (one way transmission). A case where UE is outputting max power/lowest modulation can show AMT effects. We need to answer does UE response vary based on RF energy around. If the eNB makes decisions on how UE behaves then conditions at L-Band will not affect the S-band eNB channel. Regardless, a UE has a max power and min modulation/coding scheme. If we test those boundary conditions, we have exercised the test space.	P

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						https://www.aftrcc.org/AMT_LTE_Sharing/White%20paper%20-%20AMT%20sharing%20with%20LTE%20in%20L%20band%20rev1a.pdf Justification: A pre-test / discovery phase task should be created to identify whether an AMT system operating adjacent to the AWS-3 uplink will cause the LTE system's behavior to change. If AMT operations cause a change in LTE behavior ? e.g., increased UE transmit power levels ? an LTE scenario representative of the LTE system's behavior change over time should be incorporated into the test plan to evaluate the AMT KPIs before and after the LTE system has adapted to the presence of the AMT system. Furthermore, if AMT systems operating in adjacent bands are found to have an effect on LTE behavior, this can provide important insight for achieving the test plan's goal of, ?influenc[ing] decisions on how much off-tuning and range between transmitters and telemetry receiver stations are needed to avoid harmful interference to the telemetry receivers,? (lines 528-531) from the perspective of how adjacent LTE systems should be configured to enable AMT systems to operate properly in adjacent channels ? e.g., LTE KPIs (3GPP TS 32.450) and Performance Measurements (PMs) (3GPP TS 32.425) can be used to indicate an interference issue between AMT and LTE systems, and identify which parameters in the LTE system to adjust to avoid interference. 3GPP. (2018, Jun). Performance measurements Evolved Universal Terrestrial Radio Access Network (3GPP Technical Specification 32.425 v15.1.0). 3GPP. (2018, Jun). Key Performance Indicators for Evolved Universal Terrestrial Radio Access Network: Definitions (3GPP Technical Specification 32.450 v15.0.0).		
14	NSF; Thyaga Nandagopal; 703-292-8910; tnandago@nsf.gov	379	19	1	S	Checking what number of LTE UEs will result in WGN behavior should explore a better set of parameters of number of UEs. Instead of 1, 4, 200, a suggestion is to use 1, 5, 10, 20, 50, 100, 200. It is likely that WGN behavior will be observed with less than 50 UEs, so if time/resources are a constraint, then it is better to explore the sub-50 range.	This is a valuable test to perform (how many UEs become WGN-like). We will not have time to answer that question in this test. Text change to increase number.	P

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15	Jeffrey H. Reed reedjh@vt.edu (540) 231-2972	379	9	2.3.1		It is unclear as to why the LTE operating scenarios selected would provide a useful characterization of AMT system KPIs when operating adjacent to an LTE system in AWS-3 under laboratory or real-world conditions. The proposed scenarios do not reflect any of the operating conditions of the LTE uplink proposed for study with respect to interference of federal operations in AWS-3 from CSMAC Working Group 1 (2013). Furthermore, it does not appear that the LTE scenarios are based upon improved measurements of LTE uplink conditions (DiFrancisco, 2018), as recommended by CSMAC Working Group 5 (2014). Therefore, at this time, it is not possible to evaluate whether the proposed ?surrogate LTE waveforms? represent scenarios that would provide an understanding of how adjacent LTE operations affect AMT KPIs. Additionally, it is unclear how changes to AMT KPI values during testing will be correlated to parameters in the LTE system. What are the LTE system parameters under experimental control? CSMAC. (2013, Feb 21). Appendix 3: Baseline LTE Uplink Characteristics. Final Report: Working Group 1 ? 1695-1710 MHz Meteorological-Satellite (Version 2). Available at: https://www.ntia.doc.gov/other-publication/2013/csmac-wg-1-final-report-v2 CSMAC. (2014, Mar 4). Final Report: Working Group 5 ? 1755-1850 MHz Airborne Operations. Available at: https://www.ntia.doc.gov/other-publication/2014/csmac-working-group-5-final-report DiFrancisco, M. (2018, Apr). Spectrum Sharing Test & Evaluation: LTE Characterization & Related Wireless Projects. Presented at the 2018 Wireless @ Virginia Tech Symposium, Arlington, VA. Retrieved from: https://drive.google.com/file/d/1CjIncB4AZSyEyzhCpsNAbfApAHiqoDf-/view?usp=sharing Justification: It is recommended that before generating any ?surrogate LTE waveforms?, that the test plan incorporate a list of ?LTE scenarios for test? that an AMT system would likely encounter, or are otherwise meaningful for study. Each LTE scenario to be applied to the AMT	The SSTD PRB usage statistics, UE output powers are very useful. The urban testing is not necessarily useful for test range morphologies. Using TN 1980 we have an idea of the shape of OoB emissions. To add a temporal component the boundary conditions are one UE with one PRB -to- WGN shaped to look like OoBEs. If AMT responds very differently to either extreme, pts in the middle will need to be investigated.	

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						system under test should, at minimum, describe the following LTE system parameters to aide in scenario reproducibility: 1. Range the LTE cell is expected to cover or Inter-Site Distance (ISD) 2. Cell load ? e.g., distribution of network loading (See also (CSMAC, 2013) and 3GPP TS 32.425§4.5.11) 3. Active UEs ? e.g., Average number of active UEs (See also 3GPP TS 32.425§4.4.2.2) 4. eNodeB configuration / Uplink power control (See also 3GPP TS 36.213§5) 4(a) UE power control policy: Open or closed loop 4(b) Maximum allowed UE transmit power: P_max parameter value If possible, any assumptions about the LTE system should be included in the scenarios that could alter UE emissions behavior, such as: A. UE Channel conditions (See also 3GPP TR 36.873§7.2) B. eNodeB scheduling behavior ? i.e., LTE eNodeB scheduler behavior has also been shown to have a significant impact on LTE behavior and UE power emissions (Devineni et al., 2018). Yet, LTE scheduler behavior is not standardized by the 3GPP which can make the LTE behavior difficult to quantify. C. Locations of UEs from the eNodeB ? i.e., relative position or distance from the eNodeB. Ideally, the LTE scenarios will be documented using standard LTE parameters or performance targets to specify the behavior of the LTE system making the scenario easy to communicate to the larger LTE communications communities within Government and industry. Finally, the test plan authors should consider contacting the AWS-3 Spectrum Sharing Test & Demonstration Program (DISA, 2018) to incorporate AWS-3 LTE scenario best-practices and recent findings into their proposed LTE system under test within the proposed LTE impacts on AMT test plan. 3GPP. (2018, Jun). Performance measurements Evolved Universal Terrestrial Radio Access Network (3GPP Technical Specification 32.425 v15.1.0). 3GPP. (2018, Jun). Power control. E-UTRA Physical layer procedures (3GPP Technical Specification 36.213 v15.2.0). 3GPP. (2017, Dec). Pathloss, LOS probability and penetration modeling. Study on 3D channel model for LTE (3GPP Technical Report 36.873 v12.7.0). CSMAC. (2013, Feb 21). Appendix 3: Baseline LTE Uplink Characteristics. Final Report: Working Group 1 ? 1695-1710 MHz		

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						Meteorological-Satellite (Version 2). Available at: https://www.ntia.doc.gov/other-publication/2013/csmac-wg-1-final-report-v2 Devineni, J. K., Czauski, T., Annavajjala, R., Dehnie, S. A., Reed, J. H., & Dhillon, H. S. (2018). Characterizing Power Emissions Behavior Across LTE?s Physical Uplink Channels. Paper presented at the The 2018 International Symposium on Advanced Radio Technologies (ISART), Boulder, CO. Retrieved from: https://www.its.bldrdoc.gov/media/66527/devineni_iasrt2018.pdf DISA. (2018). Advanced Wireless Services-3 (AWS-3) Spectrum Sharing Test & Demonstration (SSTD) Program: Improve Propagation. Paper presented at the The 2018 International Symposium on Advanced Radio Technologies (ISART), Boulder, CO. Retrieved from: https://www.its.bldrdoc.gov/media/66516/dso_handout_isart2018.pdf		

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16	Edison Juleau NTIA/OSM/SEAD ejuleau@ntia.doc.gov	383	9	1	technical	The test plan indicates a couple of "discovery phases" or pre-tests will have to be done. One of the discovery phases would be to determine if the UTG is adequate as a surrogate for LTE signals. The question is depending on whether the UTG or the test bed at MITRE is used, if more detail information will be provided in the test report regarding the LTE test signals used.	Yes, see Comment 15.	A
17	DISA/DSO/Strategic Planning Division Alden Smith 301-225-3814 Odell.a.smith2.ctr@mail.mil	384	9	2.3.2	S	This comment essentially applies to the broader document and stated test concept. It is understood that the test is focused on documenting the potential impacts of LTE UE device uplink energy from the 1755-1780 band into AMT receivers operating in the adjacent 1780-1850 MHz band. A critical element in the actual impact of LTE energy from the 1755-1780 MHz band into AMT receivers in the 1780-1850 MHz band is the filter performance of AMT receivers (whether legacy or upgraded). Such filter performance does not appear to be included in this test and so the test appears to be focused on capturing symptoms of a phenomenon while not taking the opportunity to capture the actual source of the problem. LTE signals are designed to operate in the 1755-1780 MHz band. If AMT receivers tuned within the 1780-1850 MHz band capture degrading levels of interference due to poor filter design; this test will not provide insight into that cause. Recommendation: The test should incorporate spectrum analyzer measurements of the AMT receiver filters to correlate with the other measurands that are planned.	If LTE power levels are reported then could a filter be chosen to 'lower' OoB power? Question to our group is it worth adding a control factor - different AMT front end filters. Looks like it is worthwhile to add a new factor at two levels: "AMT Receiver Filter" (Legacy, Upgrade).	P
18	Edison Juleau NTIA/OSM/SEAD ejuleau@ntia.doc.gov	394	9	2	editorial	suggest using km for consistency.	Text Change	A
19	Michael Souryal souryal@nist.gov 301-975-4342	417	10	2.5		To achieve realistic dynamic behavior of the LTE uplink, both the UL and DL should experience realistic channel effects. Applies to the discussion and figure on lines 416-420. Justification:	Agree, important to study during discovery phase. No changes	P

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						If generating an LTE waveform in real time from a UE, insert a realistic channel (e.g., emulated multipath fading channel per 3GPP models) in both the UL and DL paths in order to achieve realistic resource block utilization and power control dynamics in the UL signal. If playing back a captured, surrogate LTE waveform, capture the waveform under similar conditions of realistic UL/DL channels.		
20	Michael Souryal souryal@nist.gov 301-975-4342	423	10	2.5		Ethernet, USB, and RS232 are interfaces, not protocols. Justification: Replace ?The connections may be a combination of protocols, such as ..? with ?The connections may utilize a combination of interfaces, such as ??.	Text Change	A
21	Robert Sole NTIA/OSM/SEAD rsole@ntia.doc.gov	431	11	1	technical	I think that you will need to know the RF and IF characteristics of the AMT receiver, so you can isolate the effects from a possible LNA in the AMT receiver overload from small signal effects in the detector and signal processor. In the plan you say that you may need an external amplifier added in to bring up the LTE OOB emissions to a level that might affect the signal processor after the IF filter. However if you do that the front end of the AMT receiver may be wide enough to see all of the UE fundamental signal which also gets amplified, and may cause the LNA in the AMT receive to go non-linerar which will skew the test results. So I think you need to get the info on the LNA of the AMT receiver, to investigate this possible effect. You may be able to measure it. In the past NTIA has measured the RF response of the LNA by sending a CW signal through the system and sweeping its frequency. Also by adding in an amplifier to the UE signals, you will be adding its own noise to the system as well. You may not be able to boost the UE OOB signal to a level that will cause interference on-tune with the AMT receiver without causing the LNA of the AMT receiver to be saturated or become non-linear. I also don't see where you are monitoring the UE interference power in the AMT receiver for calibration at the IF stage. In past measurements	*Monitoring IF is interesting point (EVM?) *Sweeping RF CW to measure at IF to see FDR	P

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						of receiver performance, NTIA connected a spectrum analyzer to an IF test point in a receiver to make that measurement. Perhaps the AMT receiver has diagnostics for that function. It's also a bit unclear if you intend to vary the frequency separation between the UE and the AMT receiver or what the initial or final settings for delta-F might be.		
22	Robert Sole NTIA/OSM/SEAD rsole@ntia.doc.gov	442	11	3	technical	It a bit unclear what's meant by the term "AMT link distances". I assume you mean the testing will cover the range of distances between the AMT transmitter and the AMT receiver, and in effect the result will be the carrier power of the AMT link will vary as the simulated distance, assuming free space. However I don't see any values of what that might be. I assume you will change the AMT carrier power to simulate a long distance between the AMT transmitter and receiver, and a short distance. The term "LTE activity levels" is a bit ambiguous as well. I assume you mean the power levels of the LTE UE test signal will be varied to simulate them or it being near and far distances from a AMT receiver. As noted earlier, I don't see any definition of some sort of minimum and maximum frequency separation from the UE test signal to the AMT receiver.	Activity referring to temporal aspects as well	P
23	Edison Juleau NTIA/OSM/SEAD ejuleau@ntia.doc.gov	442	11	3	editorial	Delete the word "as" from sentence.	Text Change	A

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24	JHU/APL Feng Ouyang 443-778-2490, feng.ouyang@jhuapl.edu	442	11	2.6	S	Related to the comment above. The test matrix should be a part of the test plan because it drives the test setup. For example, LTE operating conditions is listed as a part of the matrix. What specific operation conditions will be recorded, and by what instrument?	TBD in discovery	
25	Robert Sole NTIA/OSM/SEAD rsole@ntia.doc.gov	473	12	-	editorial	Suggest adding the words "is linear." after the period	Text Change, noted as "(linearity)"	A
26	Robert Sole NTIA/OSM/SEAD rsole@ntia.doc.gov	481	12	-	editorial	After isolation, add the word path, after the word waveform add the word transmitter	Text Change	A
27	Robert Sole NTIA/OSM/SEAD rsole@ntia.doc.gov	506	13		question	The potential test sites are listed, but do any of them have a shielded enclosure? Will a background scan of the electromagnetic environment via spectrum analyzer be done prior to the test measurements to at least know if any external signals are present that might affect the test results? Doing the tests via conducted methods should prevent that from happening, but it's usually a good idea to do a background scan.	Included in baseline	A
28	JHU/APL Feng Ouyang 443-778-2490, feng.ouyang@jhuapl.edu	520	14	3.1	A	Move the period inside the quotation mark. Justification: this is the US convention.	Text Change	A
29	Robert Sole NTIA/OSM/SEAD rsole@ntia.doc.gov	528	14	3	editorial	Specifically, the objective of this test is to determine the effect of AWS-3 LTE UE emissions on an AMT receiver, as a function of frequency and distance separation to preclude harmful interference.	Changed preclude to quantify Specifically, the objective of this test is to quantify the effects (including harmful interference) of various AWS-3 LTE UE emissions on an AMT receiver as a function of the factors listed on Table 2, including frequency and distance separation. In other words, we want the analysis to establish the relationship between the factors listed on Table 2 and the KPIs, also referred to response variables in design of experiments methodologies, listed on Section 2.2."	P

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Commenter Area							NASCTN Adjudication Area	
#	ORGANIZATION & POC Name, Phone, and E-mail	Line Number	Page	Para	Comment Type	Comments and Justification	Resolution	A/R/P
30	Edison Juleau NTIA/OSM/SEAD ejuleau@ntia.doc.gov	535	15	-	question	Don't understand Table 2. It seems to show up unexpectedly. I may have missed it but I don't see any reference to Table 2 in the document.	For simplicity and consistency, Table 2 was eliminated, and references are made to the KPIs listed on Section 2.2	A
31	JHU/APL Feng Ouyang 443-778-2490, feng.ouyang@jhuapl.edu	544	15	3.3	S	What is the plan of capturing space-time coding benefit? Are we talking about the S-T coding for LTE or for AMT?	AMT	P
32	Edison Juleau NTIA/OSM/SEAD ejuleau@ntia.doc.gov	552	14	2	editorial	Is one objective of the test to determine an interference protection criteria for AMT systems? If so, maybe that should be stated up front as well.	A NASCTN test report will not make IPC conclusions or recommendations.	P
33	Robert Sole NTIA/OSM/SEAD rsole@ntia.doc.gov	564	17	1	editorial	I suggest saying this…. The initial test design consists of six "Flights", where each flight consists of 13 runs for a grand total of 78 test scenarios where the data is collected.	Text Change	A
34	Edison Juleau NTIA/OSM/SEAD ejuleau@ntia.doc.gov	568	17	2	editorial	"reposes" should that be "responses"?	Text Change	A
35	Edison Juleau NTIA/OSM/SEAD ejuleau@ntia.doc.gov	568	17	2	editorial	"Table 4" I could not find a Table 4.	Table 2 (old Table 4) was removed and references are made to Section 2.2.	A
36	Robert Sole NTIA/OSM/SEAD rsole@ntia.doc.gov	585	18	2	editorial	Suggest this…. These are important to identify measurands to determine the impact of LTE UE transmitters on AMT receivers.	We are showing impacts and effects through measurements rather than determinations.	R
37	Robert Sole NTIA/OSM/SEAD rsole@ntia.doc.gov	599	18	4	editorial	Suggest this….. Data will be recorded on local media storage at the test location and will be physically removed by NASCTN personnel at the end of the measurement period.	Text Change	A

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38	Robert Sole NTIA/OSM/SEAD rsole@ntia.doc.gov	599	18	4	question	I see nothing about data release, who gets it after the test ends…	Everyone	A
39	DISA/DSO/Strategic Planning Division Alden Smith 301-225-3814 Odell.a.smith2.ctr@mail.mil	338-339	7	2.3.1	S	Text currently reads, "The AMT Rx (also known as ground station) under test receives both in band (i.e. leaking in from AMT front end filters) and out of band (OoB) LTE uplink energy." Comment: The sentence does not seem clear with regard to its meaning. It would seem that AMT "in band" energy would not be "leaking in" but the actual desired signal. The reference to "out of band" is not clear whether the energy referenced is "out of the LTE band" or "out of the AMT band". Recommend sentence be re-written.	Text Change	A
40	JHU/APL Feng Ouyang 443-778-2490, feng.ouyang@jhuapl.edu	558-559	16	3.5	S	How does this statement correspond to Table 3? For example, according to the sentence, antenna G/T ratio should be set to "factor levels" at high, mid and low. In Table 3, row 5, the G/T is to be set "continuous", "in 2 levels", and "between 1-10 dBK-1." I am confused. Also, are the choices presented here (e.g., 3 factor levels) dictated by the "space-filling" methodology or chosen based on other considerations (e.g., the total number of test runs practical)?	The design is a combination of a split-plot design and a D-optimal design with "range between transmitter and telemetry receiver" varied 13 times per "flight" to improve the features of the design (i.e. statistical power) while keeping the overall number of flights to a minimum. All other factors settings were at the low, high, or midpoints of the factor levels and only the spacing for "range between transmitter and receiver" factor levels span beyond the low, med, or high settings. The sentence that starts with "Except for range….." was deleted for clarity.	P
41	NSF; Monisha Ghosh; 703-292-8746; mghosh@nsf.gov				S	LTE usually uses power control on the uplink to optimize links and testing should include this. The effect of uplink power control on interference implies that it is not just distance of the UE to the AMT Rx that is important, but also distance to the LTE base station. Also, this	Agree, this impact will be investigated, no change	P

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						might have an impact on the distribution (Gaussian or not) when a number of UEs are transmitting.		
42	NSF; Monisha Ghosh; 703-292-8746; mghosh@nsf.gov				S	While beamforming/MIMO modes may not be implemented in all handsets, LTE does specify these for uplink transmission. These transmission modes would affect interference characteristics into AMT receivers, which should be tested.	Agree, no change	P
43	NSF; Monisha Ghosh; 703-292-8746; mghosh@nsf.gov				S	How will different filter characteristics from various UE manufacturers be incorporated into this testing? NIST TN 1980 seemed to show that for the couple of different UEs tested, there did not seem to be much difference. However, as more AWS-3 capable handsets become available, there could be larger differences between manufacturers that would need to be tested.	In LTE waveform pretest work, we hope to identify UE differences. We consider market penetration when selecting UEs	R
44	JHU/APL Feng Ouyang 443-778-2490, feng.ouyang@jhuapl.edu			2.2	S	Confirm that all listed KPIs are collected from the AMT receiver. Justification: there does not seem to be external instruments in the test setup for collecting these KPIs.	Agree, things like EVM will be tested	P
45	JHU/APL Feng Ouyang 443-778-2490, feng.ouyang@jhuapl.edu			2.4	S	How is the VSA used in the test setup?	EVM and power level monitoring changed line 404	A
46	JHU/APL Feng Ouyang 443-778-2490, feng.ouyang@jhuapl.edu			3.3, 3.4	S	Please provide explanations for Tables 2 and 3. What are the meanings of each column (especially the last 3 columns in Table 2)? How were the parameter values in Table 3 chosen, under what criteria? What are the takeaways from these tables?	Explanations added for Table 2 (old Table 3). Table 2 was removed and references are made to Section 2.2.	A
47	JHU/APL Feng Ouyang 443-778-2490, feng.ouyang@jhuapl.edu			Table 2	S	Last row: I cannot find Factor D in the report. Does it refer to the 4th row in Table 3? I don't understand how space-time coding is related to antenna G/T, and how such relationship is to be measured.	Factor D is indeed the fourth factor on Table 2 (old Table 3). The effects the factors have on the responses is established analytically with techniques such as analysis of variance (ANOVA).	P
48	JHU/APL Feng Ouyang 443-778-2490, feng.ouyang@jhuapl.edu			Table 3	S	What do HTC and ETC mean? They are not in the acronyms list.	Explanation added in Section 3.4 & acronym list	A

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49	JHU/APL Feng Ouyang 443-778-2490, feng.ouyang@jhuapl.edu			3.5	S	It would be helpful to show examples of the "whole-plot" and "sub-plot".	Sample run matrix added.	A
50	JHU/APL Feng Ouyang 443-778-2490, feng.ouyang@jhuapl.edu			3.1	S	It would be helpful to first explain what "test design" means, because, I suspect, most of the people in the audience are not familiar with that term. It seems "test design" means how to choose the parameters for each run. It would be helpful to direct the readers to the Appendix and additional references [14] concerning the basic test design methodology.	Added line at the beginning of Section 3.1.	A