COMMENTS MATRIX FOR NASCTN TEST PLAN, "Aggregate LTE: Characterizing User Equipment Emissions"								
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

HOW TO USE THE NASCTN COMMENT MATRIX if you are the coordinating organization:

Use this form to provide comments to NASCTN. Complete the header and footer, columns 2-7:

Column 1	Number the comments sequentially as they are added by each contributor.
Column 2	Enter the Organization, name, phone number, and email address for each contributor
Columns 3, 4, & 5	Enter the appropriate information for each comment. Leave columns 4 & 5 blank for general comments that apply to the entire document.
Column 6	Enter comment type (C, S, or A). (C) Critical: Critical comments apply to situations where the document violates established policy, guidance, or directives. The justification for critical comments MUST identify violations of law or contradictions of Executive Branch or Federal Agency policy; unnecessary risks to safety, life, limb, or materiel; waste or abuse of appropriations; or imposition of an unreasonable burden on an organization's resources. (S) Substantive: Make a substantive comment if a part of the document seems unnecessary, incorrect, misleading, confusing, or inconsistent with other sections, or if you disagree with the proposed responsibilities, requirements, or procedures. (A) Administrative: An administrative comment concerns non-substantive aspects of an issuance, such as dates of reference, organizational symbols, format, and grammar.
Column 7	Place only one comment per row. Enter your comment, recommended changes, and justification in the area provided. If any material is sensitive, proprietary, or requires special handing, contact the NASCTN Program Manager for guidance on marking and handling the comment matrix.

NASCTN Adjudication

Consolidate comments from all contributors and adjudicate them. Remove column 2 to maintain anonymity of contributors prior to posting to the NASCTN portal page (**https://www.nist.gov/ctl/national-advanced-spectrum-and-communications-test-network-nasctn**). Set header and footer as appropriate. Complete information in column 8 & 9:

Column 8	Enter your resolution and/or justification. Include any related communications with the contributing organization. You MUST provide convincing support for rejecting critical comments.
Column 9	Enter whether you accepted (A), rejected (R), or partially accepted (P) the comment. Your justification in column 8 must be consistent with this entry.

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1	Alion Science & Technology, Eric Germann, 240-295-5901, egermann@alionscience.com	228	8		S	Coordinator Comment: The variable L_{res} in equation 2.1 should be corrected to match the defined variable as 'L_{rec}' Coordinator Justification: Provides needed clarity	Corrected text as noted.	A
2	Venki Ramaswamy vramaswamy@mitre.org	261			A	Coordinator Comment: change later to latter. Coordinator Justification:	Corrected text as noted.	A
3	Venki Ramaswamy vramaswamy@mitre.org	324			S	Coordinator Comment: Include UE State. Coordinator Justification:	No change made to test plan. UE States will be determined and included in the final test design and test report. When the final test is designed and reported on, the UE's state (both loading and DUT UE) will be important. During factor selection the NASCTN team will make a determination on what the state of the UEs should be during testing. For example, should some fraction be active, and the rest idle, or should they all be active. **Note**: For the purposes of this response, it is assumed the commenter is referencing the RRC and EMM/ESM states.	P
4	Venki Ramaswamy vramaswamy@mitre.org	435			S	Coordinator Comment: There are also other mechanisms such as high interference indicator (HII) and Overload Indicator (OI) that could impact UE behavior. See 3GPP 36.423 for more details. Of course, it depends on whether or not eNBs are implementing these features	No change made to test plan. If implemented, these mechanisms may impact the UE's behavior. However, we don't expect to have interference situations in this testing and consider this currently outside the scope of the test. The goal of this testing is to replicate different morphologies and examine what happens to the UE's emissions and PRB distribution.	R

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5	Alion Science & Technology, Eric Germann, 240-295-5901, **egermann@alionscience.com**	437	14		S	Coordinator Comment: A reference is made to "three variable attenuators and two directional couplers" in Fig.4. Figure 4 shows two variable attenuators and three directional couplers. Coordinator Justification: **Provides needed clarity**	Test plan modified to match figure - two variables and three directional couplers.	A
6	NIST (CTL), Alex J. Yuffa, 303-497-5695,alex.yuffa@nist.gov	442-443	16	3	S	**Coordinator Comment:** Naming the folder "Copyrights and Disclaimers" is problematic because Linux/Unix doesn't handle spaces well. Moreover, Linux/Unix distinguishes between letter case and Windows does not. Thus, I recommend naming the folder "legal" or "Legal". At the very least the spaces should be removed from the name; perhaps use underscore or "CopyrightsAndDisclaimers" **Coordinator Justification:**	No change made to test plan. As written, the comments cannot be correlated to the test plan. Further information/detail from the commenter is required for additional action.	R
7	NIST (CTL), Alex J. Yuffa, 303-497-5695,alex.yuffa@nist.gov	444-446	16	3	S	Coordinator Comment: It would be very difficult to keep the same style throughout the whole software package because different parts of the software are typically written at different times. For example, some files may be written in 2000 and others in 2010 both using "standard" practices of their decade. These practices tend to change rapidly; in python, several years is considered a lifetime! I recommend dropping this requirement or changing it to "Code should be in consistent format as much as possible." Coordinator Justification:	No change made to test plan. As written, the comments cannot be correlated to the test plan. Further information/detail from the commenter is required for additional action.	R
8	Alion Science & Technology, Eric	499	16	9	S	Coordinator Comment: How will the "amplitude of the RF signal impinging on the Cell A eNB port"	Text modified to add clarity and explain how the loading level will be monitored.	A

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	Germann, 240-295-5901, egermann@alionscience.com					from Cell B loading UEs be monitored and adjusted? Coordinator Justification: Clarification of approach, unclear from description Originator Justification for Resolution:		
9	Comment generated from technical discussions with Jeff Correia jcorreia@mitre.org	502	16	6.1.1	S	Coordinator Comment: Consider replacing Cell B with gaussian noise signal Coordinator Justification: • Reduces complexity for most measurements, but Cell B may still be necessary for handover scenarios • Current test plan does not completely emulate channel between Cell B UEs and Cell A eNB.	The current test plan models the channel between the Cell B loading UEs and the Cell A eNB by passing the Cell B UL UTG signal through a variable attenuator and inserting it on the Cell A uplink traffic. This approach has the advantage of having live traffic in Cell B, but has the disadvantage of effectively modeling all of the Cell B UEs as if they were in the same geographic location. That is, in reality, the power present at the Cell A eNB will vary based on the exact location of the UE in Cell B, and be different for each Cell B UE. Given that cell-to-cell handovers are of interest, we are inclined to leave Cell B in the test plan. However, the comment is noted, and should experiments in the factor selection phase indicate that the amplitude from Cell B has a meaningful impact on the DUT UE behavior, an additional experiment could be conducted. Such investigation could then carefully model the channel between individual Cell B UEs and the Cell A eNB.	P

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							A footnote to line 501 has been added for clarification	
10	Venki Ramaswamy vramaswamy@mitre.org	508			S	Coordinator Comment: What additional insight are we going to obtain from performing handoffs? This really adds complexity to the test setup.	Modified test plan to remove the term 'handoff'. This test will not be performing handoff operations.	A
11	Venki Ramaswamy vramaswamy@mitre.org	524			S	Coordinator Comment: QXDM for example.	No change made to test plan. The test plan intentionally avoids calling out any specific make or model of test equipment. The test plan refers to the required capabilities in general terms.	R
12	Alion Science & Technology, Eric Germann, 240-295-5901, egermann@alionscience.com		17	1	S	Coordinator Comment: What type of EPC will be utilized in the LTE system setup, hardware or software based? Coordinator Justification: EPC may be required to support inter-cell HO	Test plan modified to explicitly state requirement for backend equipment like an EPC. The test team acknowledges an EPC is required, but the specific make/model doesn't matter. The details of the EPC are facility dependent and may change.	P
13	Alion Science & Technology, Eric Germann, 240-295-5901, egermann@alionscience.com	539	17		S	Coordinator Comment: What step size and overall dynamic range is required for these variable attenuators? Coordinator Justification: Sufficient dynamic range enables necessary fluctuations in signal level.	The text has been clarified to reflect that the size and dynamic range of the attenuators will be determined based on the morphologies selected during the factor selection phase.	A
14	Alion Science & Technology, Eric Germann, 240-295-5901, egermann@alionscience.com	544	17		S	Coordinator Comment: How will a loaded cell be defined? Will there be multiple levels of loading? How is a cell loading level verified during the measurement? Coordinator Justification: Important to processing data in understanding conditions present during measurement	The text in section 6.3 modified to explicitly mention variable numbers of UEs within existing discussion of UE loading in the "offered load" sense. It was already included in Table 1. Loading will be monitored during testing by use of the UTG. However, since UTGs vary, the	A

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							exact method of monitoring is not known at this time and will be documented in the final report.	
15	Venki Ramaswamy vramaswamy@mitre.org	562			S	Coordinator Comment: Should we really restrict ourselves with UDP? Many of the UE emulators can support TCP traffic also.	No change made to test plan. The team acknowledges many UTGs can also support TCP traffic. As discussed in Section 6.3, UDP traffic was selected because it has the least amount of handshaking/downlink traffic.	R
16	Aviation Spectrum Resources Inc. Gregory Baker 269-923-9993 gdb@asri.aero	562	18	3	S	Coordinator Comment: UDP (VoLTE) is the only data format used in the uplink. This will not create an accurate spectral emissions for a few reasons. 1. VoLTE is a GBR using WB-AMR. It may use a fix number of PRB's, with constant interval for transmission. A non-GBR could use a larger number of PRB's, and create a large "burst" of data 2. Handshaking is necessary. The Air interface is designed different for VoLTE. There will not be a HARQ or packet retransmissions in layer 3 UDP VoLTE, or additional signaling for format/modulation scheme on control channels. Coordinator Justification: Include non-GBR traffic	The test plan has been modified to include a test where a portion of the loading UEs have a different QCI value (one where the packet delay budgets and target loss rate are lower than the default traffic type). This will help replicate scenarios where the UE traffic types are varied. The distribution of QCI values for a given morphology with be determined during the test and documented in the final report.	A
17	Aviation Spectrum Resources Inc. Gregory Baker 269-923-9993 gdb@asri.aero	576	18	5	S	Coordinator Comment: There is a parameter set for the maximum number of UE's transmitting, but that also should include the PUCCH, and PUSCH. Adjusting the scheduler, and buffer load (the UE's will transmit buffer information) will affect this. Also, future QoS bearers can also effect this. Each vendor will implement the scheduler differently.	Comment is outside the scope of the test measurement. One of our goals is to exercise the LTE system (i.e., UTG, eNB, DUT UE) such that we see the largest range possible of UEs/TTI. We agree that the QoS and traffic type (e.g., Facebook, SMS, VoLTE, YouTube, etc.) may have an impact on the PRB distribution. However, we lack real-	R

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						It would also be important to include the PRACH channel, as this would have the most effect. At a special event, you could have many users transmitting per TTI. Recommendation would be to have representation of a cell, with users doing YouTube/Facebook/Text/VoLTE. Coordinator Justification: Have actual representation of what users are doing, so that the scheduler can accurately assign resources.	world data on the distribution of traffic types for given morphologies. Even if provided, testing a large number of traffic distributions and types is outside the scope of the testing. At best, we plan to provide information on how sensitive the PRB distribution is to traffic type. Our ability to do this will depend on the hardware selected for testing and will be documented in the final report. If deemed important, this can be proposed as a follow-on test measurement project.	
18	Venki Ramaswamy vramaswamy@mitre.org	590			S	Coordinator Comment: By making sure that there are enough UEs, we can make sure that eNB is loaded. We should test with real traffic types, not always full buffer.	No change made to test plan. Test plan already incorporates scenarios that vary scheduling and number of UEs which simulate less than full buffer condition. More detail is needed to make any changes to the test plan.	R
19	Venki Ramaswamy vramaswamy@mitre.org	600			S	Coordinator Comment: What is this timer?	Response: The timer variable defines the time in which the UE has to send useful data after either the initial grant or a previous reception of useful data. It may or may not prove to be relevant to our deliverables and will be documented in the final test report.	A
20	Venki Ramaswamy vramaswamy@mitre.org	602, 603			S	Coordinator Comment: Please be more specific.	Test plan modified to stress that the list is not exhaustive and will be updated after factor selection. The goal of this list is to provide initial list of variables that may impact the deliverables of this measurement campaign. The variables shown	A

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							likely exist in most commercial eNBs, but their exact name may vary based on the eNB manufacturer. The factor selection will determine the actual list of variables used in the measurement and the final report will document the variables and their impact on the deliverables.	
21	Venki Ramaswamy vramaswamy@mitre.org	606			S	Coordinator Comment: Perhaps we could add RRC connection timers and Random access parameters.	Test plan modified to add RRC connection timer and Random access to the list of likely variables to influence measurement campaign deliverables. The final test report will document what variables impacted the deliverables.	A
22	Venki Ramaswamy vramaswamy@mitre.org	719			S	Coordinator Comment: Can we also add MAC CEs? PHR reports, BSRs etc are MAC CEs.	No change made to the test plan. The collection of all MAC CEs may be possible, but it may not be essential to complete the measurement. Collecting all MAC CEs may create an additional burden during data processing and fall outside the scope of this measurement. The final report will document any MAC CEs determined important to the measurements.	R
23	Alion Science & Technology, Eric Germann, 240-295-5901, egermann@alionscience.com	735	22	3	S	Coordinator Comment: How will this time synchronization be accomplished? Stratum 1/2 timing source such as GPS receiver or NTP server. Coordinator Justification: Crucial in maintaining alignment of data in time on the order of a single TTI	No change made to test plan. The way in which this will be accomplished will depend on the hardware used for the final set of measurements. At this point, we recognize the challenge posed by achieving this level of synchronization. Most of this challenge lies in synchronizing the UTG with the acquisition hardware (e.g., UE diagnostic monitoring software and RF receiver). Where possible, we will use GPS locked receivers or NTP servers,	P

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							but the synchronization options on some UTGs are limited. The final report will document the method used in the test measurements.	
24	Aviation Spectrum Resources Inc. Gregory Baker 269-923-9993 gdb@asri.aero	951	27	3	S	Coordinator Comment: Closed loop power control is only being considered for spectral mask. Open loop power control is more important for spectral mask. In LTE, the user is typically assigned RRC resources for 8-12 second, and in high capacity setting maybe 4-6 seconds, to reduce the number of connected UE's based on the BBU. There is also an initial PRACH power target for the PUCCH PUSCH. The UE will then increase power and retransmit 4 or more times before a timer kicks in. The UE's will RACH often, think about this from the User perspective. You open the Facebook app, scroll around, but it you don't request any data, you will lose the RRC resources. (I think the parameter is the T301 timer: **http://www.rfwireless-world.com/Terminology/LTE-timers.html**) Since the Air Interface has a specific PRB to RACH, you will not get an accurate picture of the total number of UE's transmitting Coordinator Justification: Have actual representation of what users are doing, so that the RACH can show an accurate number of users	No change made to test plan. Comment is outside the scope of the test measurement. One of our goals is to exercise the LTE system (i.e., UTG, eNB, DUT UE) such that we see the largest range possible of UEs/TTI. However, we lack real-world data on the open loop power control. At best, we plan to provide information on how sensitive the PRB distribution is to power control. Our ability to do this will depend on the hardware selected for testing and will be documented in the final report.	R

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						transmitting and power control is accurate (Combination of open loop and closed loop).		
25	Mike DiFrancisco VT-ARC 571-384-3810 mikedifrancisco@vt-arc.org	993		8.3.1	S	Coordinator Comment: How will NASCTN generate power/EIRP CDFs as a function of variable measurement times (section 8.3.1, line 993) Coordinator Justification:	The text in Section 7.3.1 has been modified for clarity. In addition, text clarifying that the CDFs will be marginalized over DUT UE location has been added to Sections 7.2 and 7.3.1.	A
26	Mike DiFrancisco VT-ARC 571-384-3810 **mikedifrancisco@vt-arc.org**			6 and 6.1	S	Coordinator Comment: Might the plan to "fully load" the eNB using a UTG might have biasing effects on the EIRP distributions for the DUT? (Section 6 & 6.1). Coordinator Justification:	Prior work has asserted that the presence of other UEs in the cell may cause a single UE (in this case our DUT UE) to transmit additional power. This is one of the possibilities we investigate in this testing. The final report will document the measured results	A
27	Alion Science & Technology, Eric Germann, 240-295-5901, egermann@alionscience.com	1020	29	5	A	Coordinator Comment: The reference to Appendix A should be changed to reference Appendix B. Coordinator Justification: Clarifies organization of information	Corrected text as noted**.**	A
28	Alion Science & Technology, Eric Germann, 240-295-5901, egermann@alionscience.com				S	Coordinator Comment: What frame of reference is used by UE diag. software to measure power? Peak vs. RMS, resolution BW? Coordinator Justification: A common frame of reference will need to be used for all power measurements, or converted accordingly.	Modified test plan in sections 5.1 and 6.8 to more explicitly state the objective to measure and compare the self-reported and measured power. The RBW, detector type, etc. a UE uses when it measures/reports power level is currently unknown, and will be documented in the final report.	A

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29	Mike DiFrancisco VT-ARC 571-384-3810 **mikedifrancisco@vt-arc.org**				S	Coordinator Comment: The plan for traffic loading on the DUT (both amount and type) is not clear to me, and (more importantly) I'm uncertain how variations in DUT Traffic Load/type will be evaluated wrt its impact on EIRP CDF (sensitivity?). Coordinator Justification:	No change made to test plan. The exact details of the amount and type of loading will be determined during the factor selection phase of measurements. In essence, one of the outcomes of the measurements will serve as evidence to suggest (or refute) what the loading [parameter] has on the EIRP CDF. This will be examined by changing the traffic loading (amount or type), holding all other variables constant, and repeatedly measuring the EIRP CDF. The final report will document the results.	R
30	NTIA, DOC, 2024826325 mshamma@ntia.doc.gov				S	Coordinator Comment: Comment 1) Possibly it was brought up, but in case otherwise, for services and users that are at higher altitudes, such as aircraft and satellite, the aggregate interference and radio coverage using cells heights (in addition to radius) would be of potential benefit. Example of cells and height incorporation into the radio line of sight is shown in a sample paper attached hope ok to share along…. (although shown for other than LTE, it is equally applicable to other services). Other reference that may be of interest which was cited in the above include technical paper D. Matolak, "3-D outside cell interference factor for an air-ground CDMA "cellular" system," Vehicular Technology, IEEE Transactions on , Volume: 49 Issue: 3,, Page(s): 706 -71 , May 2000 Coordinator Justification:	No change made to test plan. The potential benefit is noted; however, this is beyond the scope of this test. A follow-on test could be proposed and executed to evaluate these impacts.	R

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31	NTIA, DOC, 2024826325 mshamma@ntia.doc.gov				S	Coordinator Comment: Comment 2) Additionally interference from mobile air users to other air users or from air to ground users, may be another area depending on technologies currently in use, example Aircell (or called gogos network) of 250 cell towers which are intentionally pointing upwards for cell users, and are expected to be supporting LTE users whom although may not be as many, still account for a segment of the aggregate given the large number flights at any time. See gogoair.com for example, and a sep 28 news release in that site as well about LTE future launch (or may be current presently) Coordinator Justification:	No change made to test plan. The potential benefit is noted; however, this is beyond the scope of this test. A follow-on test could be proposed and executed to evaluate these impacts.	R
32	NTIA, DOC, 2024826325 mshamma@ntia.doc.gov				S	Coordinator Comment: Comment 3) Similarly to other examples above, a recent IEEE spectrum article had highlighted the use of mobile and drone flying base stations especially useful in disaster relief or hard to reach locations. Those although may be not as common to date, may or may not present a future factor. See article posted Auf 29, 2017 in IEEE spectrum and titled "When Disaster Strikes, Flying Cell Towers Could Aid Search and Rescue" for one reference…. Coordinator Justification:	No change made to test plan. The potential benefit is noted; however, this is beyond the scope of this test. A follow-on test could be proposed and executed to evaluate these impacts.	R