ANSC-C63® Interpretation Request Form

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Submission Date	Originator Name, Company
08/21/2023	Richard Jankovics, UL Solutions

Standard	Clause/ Sub clause	Paragraph Figure/ Table	Type (General/ Technical/ Editorial)	Comment / Inquiry	Subcommittee Response (to be filled in by Subcommittee Chair)

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USEMC C63.27-2021	A.3.3.3.1	1	Technical	Tier 2 guidance for 2.4 GHz Wi-Fi radios indicates that the unintended signals should be on EARFCN 39600 (lower) and 39700 (upper) with a 1.4 MHz signal BW. From what I can find, 1.4 MHz is not supported on any LTE bands operating on those EARFCN channels. Furthermore, the FRC's specified are not consistent with a 1.4 MHz BW. See additional information for clarity below. - FRC R.7 is specified as a 10 MHz BW. It also specifies 50 allocated resource blocks, which requires a minimum bandwidth of 10 MHz; a 1.4 MHz BW would be limited to a maximum of 6 RB. - A.5-5 does not explicitly specify the BW; however, it also specifies 50 allocated RB, again consistent with a 10 MHz BW. - The channel number / center frequency specified with a 10 MHz BW would place the channel right against the band edge, closest to the intended signal. Using the specified 1.4 MHz BW without changing the channel number / center frequency results in a greater separation between the intended and unintended signal and does not represent the worst-case channel selection. By contrast, Tier 1 LTE signals use a 10 MHz BW, which is consistent with the specified configurations. Can it be confirmed that the 10 MHz BW is correct for Tier 2 guidance, as shown in the Tier 1 guidance?	The requestor is correct. Table A.3.4.1-3 from 3GPP TS36.101 (version 2016-01) does not provide sufficient guidance to generate a 1.4 MHz LTE signal with 64 QAM modulation as described in Sections A.3.3.3.1 and A.2.3.2.1. of C63.27-2021. Similarly, the R.7 signal cited by those two sections of C63.27-2021 is only specified for 10 MHz. To keep the burden of generating an unintended signal reasonable, users performing coexistence testing pursuant to A.3.3.3.1 and/or A.2.3.2.1 should use a 1.4 MHz LTE signal with QPSK modulation as described in Table A.3.4.1-1 of 3GPP TS36.101 (version 2016-01). This corresponds to a Fixed Reference Channel (FRC) signal of R.4 for time-division duplexed (TDD). Using this QPSK signal with 1.4 MHz bandwidth for Tier 2 testing preserves a meaningful difference between Tier 2 and the other tiers. As described in Section 5.4.1 of C62.27-2021, Tier 1 testing is designed to provide a more stringent coexistence test for EUTs where the consequences from a failed wireless link are most severe. Tier 3 testing provides a less stringent coexistence test, with Tier 2 falling between Tiers 1 and 3. With respect to the 1.4 MHz signal being set at an EARFCN of 39600 or 39700, this guidance remains unchanged. This level of testing is appropriate for Tier 2, as it provides a more stringent test compared to Tier 3 where no adjacent band signal is present. In Tier 1 testing, this signal is changed to a 10 MHz LTE signal directly adjacent to the EUT operating in the 2.4 GHz ISM band. Though there may be no commercial deployments of 1.4 MHz LTE, there isn't anything that prevents that type of signal being generated with that carrier frequency; assuming a signal generator is being used. In the event the coexistence testing is being done with commercial hardware (e.g., a live network) that isn't capable of 1.4 MHz at the required EARFCN, the entity performing the testing has the option of testing with a 5 MHz signal or at the higher tier with a 10 MHz signal. Other options may be present. Any deviations from Annex A should be noted in the test report.

Table A.3.4.1-3: Fixed Reference Channel 64QAM R=3/4

Parameter	Unit	Value					
Reference channel			R.5 TDD	R.6 TDD	R.7 TDD	R.8 TDD	R.9 TDD
Channel bandwidth	MHz	1.4	3	5	10	15	20
Allocated resource blocks			15	25	50	75	100
Uplink-Downlink Configuration (Note 3)			1	1	1	1	1
Allocated subframes per Radio Frame (D+S)			3+2	3+2	3+2	3+2	3+2
Modulation		64QAM	64QAM	64QAM	64QAM	64QAM	64QAM
Target Coding Rate			3/4	3/4	3/4	3/4	3/4
Information Bit Payload							
For Sub-Frames 4,9	Bits		8504	14112	30576	46888	61664
For Sub-Frames 1,6	Bits		6968	11448	23688	35160	46888
For Sub-Frame 5	Bits		N/A	N/A	N/A	N/A	N/A
For Sub-Frame 0	Bits		6968	12576	30576	45352	61664
Number of Code Blocks per Sub-Frame (Note 4)							
For Sub-Frames 4,9			2	3	5	8	11
For Sub-Frames 1,6			2	2	4	6	8
For Sub-Frame 5			N/A	N/A	N/A	N/A	N/A
For Sub-Frame 0			2	3	5	8	11
Binary Channel Bits Per Sub-Frame							
For Sub-Frames 4,9	Bits		11340	18900	41400	62100	82800
For Sub-Frames 1,6	Bits		9828	16668	33768	50868	67968
For Sub-Frame 5	Bits		N/A	N/A	N/A	N/A	N/A
For Sub-Frame 0	Bits		9252	16812	39312	60012	80712
Max. Throughput averaged over 1 frame	Mbps		3.791	6.370	13.910	20.945	27.877
UE Category			≥ 1	≥ 2	≥ 2	≥ 2	≥ 3

Note 1: 2 symbols allocated to PDCCH for 20 MHz, 15 MHz and 10 MHz channel BW; 3 symbols allocated to PDCCH for 5 MHz and 3 MHz; 4 symbols allocated to PDCCH for 1.4 MHz. For subframe 1&6, only 2 OFDM symbols are allocated to PDCCH.
Note 2: Reference signal, synchronization signals and PBCH allocated as per TS 36.211 [4]
Note 3: As per Table 4.2-2 TS 36.211 [4].
Note 4: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).

Table A.5-1 FRC parameters for performance requirements (64QAM 5/6)

Reference channel	A5-1	A5-2	A5-3	A5-4	A5-5	A5-6	A5-7
Allocated resource blocks	1	6	15	25	50	75	100
DFT-OFDM Symbols per subframe	12	12	12	12	12	12	12
Modulation	64QAM	64QAM	64QAM	64QAM	64QAM	64QAM	64QAM
Code rate	5/6	5/6	5/6	5/6	5/6	5/6	5/6
Payload size (bits)	712	4392	11064	18336	36696	55056	75376
Transport block CRC (bits)	24	24	24	24	24	24	24
Code block CRC size (bits)	0	0	24	24	24	24	24
Number of code blocks - C	1	1	2	3	6	9	13
Coded block size including 12bits trellis termination (bits)	2220	13260	16716	18444	18444	18444	17484
Total number of bits per sub-frame	864	5184	12960	21600	43200	64800	86400
Total symbols per sub-frame	144	864	2160	3600	7200	10800	14400